Summary Report of the World Trade Center Technical Review Panel Meeting

September 13, 2004

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Prepared for:

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Prepared by:

Eastern Research Group, Inc.
110 Hartwell Avenue
Lexington, MA 02421

NOTICE

This report was prepared by Eastern Research Group, Inc., an EPA contractor, as a general record of discussion held during the sixth meeting of the World Trade Center Technical Review Panel held September 13, 2004 at St. John's University. This report captures the main points and highlights of the meeting. It is not a complete record of all details discussed, nor does it embellish, interpret, or enlarge upon matters that were incomplete or unclear. Statements represent the individual view of each meeting participant, and may or may not represent the analyses or positions of EPA.

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ACRONYMS

CBPR	Community-Based Participatory Research
COPC	contaminants of potential concern
DEP	Department of Environmental Protection
EPA	U.S. Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
FDNY	Fire Department of New York
HCDD	hexachlorodibenzo-p-dioxin
HVAC	heating, ventilation, and air conditioning
LMDC	Lower Manhattan Development Corporation
MMVF	man-made vitreous fibers
MMWR	Morbidity and Mortality Weekly Report
NCEA	National Center for Environmental Assessment
NYC	New York City
NYU	New York University
NHANES	National Health and Nutrition Examination Survey
ORD	Office of Research and Development
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBDE	Polybrominated Diphenyl Ether
PTSD	Post-Traumatic Stress Disorder
USGS	U.S. Geological Survey
WTC	World Trade Center

EXECUTIVE SUMMARY

After the collapse of the World Trade Center (WTC) and the subsequent release of contaminants into the environment, the U.S. Environmental Protection Agency (EPA), other federal agencies, New York City (NYC), and New York State public health and environmental authorities focused on numerous cleanup, dust collection, and ambient air monitoring activities to ameliorate and better understand the human health effects of the disaster. While these monitoring and assessment activities were ongoing, EPA began planning for a program to clean and monitor residential apartments. Residents impacted by the World Trade Center dust and debris were eligible to request federally funded monitoring and/or cleaning of their residences. The cleanup continued into the summer of 2003, by which time EPA had cleaned and monitored 3,400 apartments and monitored an additional 800 apartments.

Since then, EPA convened a technical panel of experts who have been involved with the World Trade Center assessment activities to provide advice on the effectiveness of these and related programs. Dr. Paul Gilman, EPA Science Advisor, serves as the chairperson, and Dr. Paul Lioy, Professor of Environmental and Community Medicine at the Environmental and Occupational Health Sciences Institute of the Robert Wood Johnson Medical School-UMDNJ and Rutgers University, serves as vice chair. This report summarizes the sixth technical panel meeting in New York City, held at St. John's University in Saval Auditorium on September 13, 2004.

Dr. Gilman facilitated the meeting and presented opening comments on the agenda for the meeting. The agenda for this meeting is presented below:

- Opening Remarks
- Report from Community Participation Committee and Discussion
- Report from Signature Subgroup and Discussion
- Status Update on Deutsche Bank and Discussion
- Overview Presentation on Sampling and Analyses Proposal
- Morning Public Comments/Question and Answer Session
- Human Health Effects Panel #1
    - WTC Worker and Volunteer Medical Screening Program
    - Airway and Lung Disease among Fire Department of New York (FDNY) Firefighters
    - Overview of WTC Health Registry
- Human Health Effects Panel #2
    - WTC Dust Effects on Human Development
    - Respiratory Effects in Residents near Ground Zero
    - Physical Exposure vs. Mental Stress
- Afternoon Public Comment/Question-and-Answer Session
- Adjourn

Individual panelists proposed the following key conclusions and suggestions during the meeting:

- The community does not want residential air sampling included in the Sampling and Analysis Plan.
- The community believes lead should be included as an analyte.
- The community believes EPA and the technical panel should oversee the Deutsche Bank deconstruction.
- The community believes that the WTC Health Registry should be shut down. Some panelists did not agree that the Health Registry is not useful.
- Some panelists and the community agreed that the Sampling and Analysis Plan should provide for a contingency if the WTC signatures are not successfully identified.
- Some panelists believe that the Sampling and Analysis Plan should discuss the next steps and action items if WTC contamination is found in a sampled location.
- A panelist and the community requested that EPA develop a factual summary of the Deutsche Bank data and make that summary available to the public.

1. INTRODUCTION

After the collapse of the World Trade Center (WTC) and the subsequent release of contaminants into the environment, the U.S. Environmental Protection Agency (EPA), other federal agencies, New York City (NYC), and New York State public health and environmental authorities focused on numerous cleanup, dust collection, and ambient air monitoring activities to ameliorate and better understand the human health effects of the disaster. While these monitoring and assessment activities were ongoing, EPA began planning for a program to clean and monitor residential apartments. Residents impacted by the World Trade Center dust and debris were eligible to request federally funded monitoring and/or cleaning of their residences. The cleanup continued into the summer of 2003, by which time EPA had cleaned and monitored 3,400 apartments and monitored an additional 800 apartments. Since then, EPA has been developing a draft sampling plan to study the contamination and recontamination of spaces in lower Manhattan that may have been contaminated by the WTC disaster.

EPA convened a technical panel of experts who have been involved with the World Trade Center assessment activities to provide advice on the effectiveness of these and related programs. Dr. Paul Gilman, EPA Science Advisor, serves as the chairperson, and Dr. Paul Lioy, Professor of Environmental and Community Medicine at the Environmental and Occupational Health Sciences Institute of the Robert Wood Johnson Medical School-UMDNJ and Rutgers University, serves as vice chair. Members of the panel include representatives from the federal agencies directly involved in the air quality response and monitoring, the New York City Departments of Health and Environmental Protection, and outside experts.

EPA's goals in forming this panel and holding the current and planned meetings are:

- To obtain more input on ongoing efforts to monitor the situation for New York residents and workers impacted by the collapse of the WTC.
- To help guide EPA's use of the available exposure and health surveillance databases and registries to characterize any remaining exposures and risks, identify any unmet public health needs, and recommend any steps to further minimize the risks associated with the aftermath of the WTC attacks.

Six technical panel meetings and one conference call have been held to date:

- March 31, 2004 at the Alexander Hamilton U.S. Customs House;
- April 12, 2004 at the Tribeca Performing Arts Center at the Borough of Manhattan Community College;
- May 12, 2004 conference call;
- May 24, 2004 at Saval Auditorium at St. John's University;
- June 22, 2004 at Saval Auditorium at St. John's University;
- July 26, 2004 at Saval Auditorium at St. John's University; and
- September 13, 2004 at Saval Auditorium at St. John's University.

This report summarizes the presentations and panel discussions at the September 13, 2004 technical panel meeting. Information on each of these meetings is provided on EPA's website (http://www.epa.gov/wtc/panel).

1.1 Panel Attendees

The following panel members were not present at this technical panel meeting:

- Patricia Clark
- Joseph Picciano
- Claudia Thompson

Gil Gillen served as an alternate for Patricia Clark. Ms. Gillen is the OSHA Region 2 Assistant Regional Administrator for Federal/State Operations.

1.2 Purpose and Agenda

The purpose of this technical panel meeting was to:

1) Review the status of the sampling and testing proposal to determine the geographic extent of contamination (refined from comments received during the July 26th Technical Panel Meeting);
2) Provide an update on the WTC signature validation study; and
3) Brief the panel members on current public health studies related to WTC impacts.

The agenda for this meeting is presented below and provided in Attachment A:

- Opening Remarks
- Report from Community Participation Committee and Discussion
- Report from Signature Subgroup and Discussion
- Status Update on Deutsche Bank and Discussion
- Overview Presentation on Sampling and Analyses Proposal
- Morning Public Comments/Question and Answer Session
- Human Health Effects Panel #1
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- Adjourn

2. WELCOME, PURPOSE, AND OPENING REMARKS

Dr. Paul Gilman, EPA Science Advisor

Dr. Gilman welcomed the participants, reviewed the agenda for the meeting, and introduced Catherine McVay Hughes and Micki Siegel de Hernandez for the first presentation.

3. REPORT FROM COMMUNITY PARTICIPATION COMMITTEE AND DISCUSSION

Catherine McVay Hughes and Micki Siegel de Hernandez

Catherine McVay Hughes and Micki Siegel de Hernandez presented a report from the Community Participation Committee reflecting activities since the July 2004 meeting and ongoing community concerns.

Ms. McVay Hughes stated that the committee and EPA have finalized the statement of work for the task order that EPA provided to the committee for implementing the Community-Based Participatory Research (CBPR) process. They are in the process of planning a scoping meeting for this task order, and are discussing plans to have a community meeting with the Deutsche Bank representatives. The committee is in the process of reviewing the proposed revised Sampling and Analysis Plan, which was posted to the internet on September 2, 2004.

Ms. Siegel de Hernandez reviewed the community's ongoing concerns. The community would still like to be involved in the development of the agenda for the Technical Panel meetings. They noted specific requests to have presentations from science and policy representatives that they have selected, and noted a continued concern that they feel omitted from the scientific process. They hope that the implementation of the CBPR process will allow more involvement for the community.

Ms. Siegel de Hernandez presented some additional questions and comments to the panel:

- Who influences the final decisions about operating procedures for the panel?
- What is the role of the White House Council on Environmental Quality in this process?
- What is the budget for the Technical Panel review?
- What funds will be provided for screening and treatment of victims of WTC contamination?
- Some members of the community have repeatedly requested transcripts of these meetings, and do not find that digital recordings are an adequate substitute.

The committee also had comments about EPA's proposed sampling and analysis program, noting that the community had reached a consensus that:

- No indoor air sampling should occur for individual units because aggressive air sampling would negatively affect participation, and modified aggressive air sampling did not work.
- WTC signature study is a research study concept at this time. The current sampling protocol should be revised to reflect that a sampling protocol will proceed even if a signature is not validated.
- Lead must be included in the list of analytes.
- The WTC community will only participate in outreach for a sampling program that they have confidence in.

Ms. McVay Hughes and Ms. Siegel de Hernandez then reviewed the Community Participation Committee's concerns regarding unmet health needs. The Community Participation Committee requested that EPA lead the Deutsche Bank deconstruction efforts, including developing exceedence standards for this project. The Community Participation Committee requested that an expert on high rise demolition be provided for the next panel meeting, and that EPA make available all of the information that it has regarding Deutsche Bank.

Ms. McVay Hughes and Ms. Siegel de Hernandez noted that Community Board #1 made the following resolutions:

- The Deutsche Bank test protocol should be provided to the public.
- Contingency plans should be provided to the public.
- Measures are needed to seal the building.
- The deconstruction should use state-of-the-art monitoring equipment.

Additionally, Ms. McVay Hughes and Ms. Siegel de Hernandez noted that the public also wants information on the deconstruction of Fiterman Hall.

The last topic in the Community Participation Committee presentation addressed concerns with the WTC Health Registry. The committee believes there are serious methodological flaws in the WTC Health Registry, including:

- No community or labor input
- No exposure definition
- Poorly worded questions
- Based on self reporting
- Poor enrollment

The community does not believe that the WTC health registry can be enhanced and believes that EPA should provide no further funds to the registry. Instead, the community believes that money should be used for medical screening and treatment.

Panel Discussion

Matt Lorber asked for verification that the community suggested that the sampling plan include no air monitoring. McVay Hughes and Siegel de Hernandez confirmed this was true.

4. REPORT FROM SIGNATURE SUBGROUP AND DISCUSSION
Greg Meeker, U.S. Geological Survey (USGS) Research Geologist
Nancy Adams, EPA Office of Research and Development (ORD) National Homeland Security Research Center Safe Building Center

Mr. Meeker presented some preliminary analytical results from the archived WTC dust samples. He reviewed the methods being used for sample preparation and then presented the analytical methods, noting that each sample requires about 1.5 days to analyze.

Mr. Meeker presented a map of where these archived samples were collected. The Signature Subgroup will analyze a representative subset of these samples.

Mr. Meeker presented some preliminary results of the analysis, including some images of man-made vitreous fibers (MMVF) greater than 3 microns. He summarized these preliminary results noting that patterned trends are developing and the analysts are hopeful that this method will succeed.

Dr. Gilman then introduced Nancy Adams, from EPA's National Homeland Security Center. Dr. Adams reviewed the considerations for developing a signature for the WTC fire particles emitted as a result of 9/11. This signature will be different from the building collapse dust, and should be unique from urban dust to be distinguishable from the signatures. The signature needs to be persistent, able to be detected in low quantities with little interference from other dust components, and consistently found in impacted areas.

Dr. Adams reviewed the desirable characteristics for analysis, including low cost (due to the large amount of samples that will require analysis), availability of laboratories with rapid turnaround, and automated methods for analysis. She listed five potential components of the fire particle signature:

- Organics on dust particles;
- Ratio of specific polycyclic aromatic hydrocarbons (PAHs);
- Sulfates;
- Total organic carbon; and
- Brominated organic compounds (i.e., polybrominated diphenyl ethers [PBDEs] fire retardants and their combustion byproducts).

Dr. Adams concluded her presentation, and she and Mr. Meeker asked for any questions from the panel.

Panel Discussion

An unnamed community member suggested that a signature developed with samples from Lower Manhattan can only be representative of the geographic area from which the samples were collected. A separate signature should be developed for other areas. Lioy explained that the process of air dispersion modeling typically begins with determining the characteristics of the sample at the original source (i.e., stack). The nearest available substitute for the original source sample is the bulk dust collected right after 9/11. The later-collected samples will be compared to the signature to see if it holds up. Nancy Adams further clarified that her group will be collecting samples all across the NYC area and will provide them to the signature group.

Stellman asked what will happen if you find something in the samples and it doesn't match the signature. Gilman responded that we'll receive the data as it's generated and we'll be sampling and analyzing for the COPC and the signature in parallel. The sampling and analysis of COPC and the signature are not reliant on one another. Lippman noted that the signature development effort will not be complete until background samples are collected, and every location is expected to have a different mass component composition.

Newman and Prezant agreed that the absence of a signature cannot preclude cleanup where the COPCs are found. Lippman said that testing for COPCs will not be interpretable.

Prezant asked that the signature development consider that the aerosolized particles should have traveled farther than the dust particles. Lioy responded that only dust samples are available, since no gaseous samples were collected in the first few days after 9/11.

Newman asked if all of the initial samples are archived samples. Meeker responded that these initial samples are archived samples, and the subgroup will need guidance from the panel to determine how long the development will occur. The longer you spend on a sample, the better the data. He noted, however, that the next steps (including sampling) do not need to wait for these analyses to be completed.

Newman asked the group how these analyses will establish a relationship over time, and how the relationship between the COPCs, the signature, and other substances can be evaluated. Adams clarified that her group will be collecting contemporary samples that may assist in answering these questions and also will inform the relationship of the different signatures to COPCs.

5. STATUS UPDATE ON DEUTSCHE BANK AND DISCUSSION

Pat Evangelista, EPA Region 2
Nancy Adams, EPA ORD National Homeland Security Research Center Safe Building Center

Pat Evangelista reviewed EPA's activities with respect to the Deutsche Bank deconstruction since the July Technical Panel Meeting. EPA Region 2 has convened two meetings involving federal, state, and local partners, the insurance companies, Lower Manhattan Development Corporation (LMDC), and Deutsche Bank representatives and their consultants. Mr. Evangelista worked with Dr. Adams to obtain access to the samples from the building to be used in the signature development process. Through these meetings, EPA obtained an electronic copy of sampling data from Deutsche Bank on a hard drive. These data consume 150 gigabytes of information, and EPA is working to establish a copy of the data at the EPA library. EPA will update the group as more progress is made.

Nancy Adams made a related, short presentation describing ORD's activities. ORD collected indoor dust samples from Deutsche Bank and will collect additional indoor dust samples from about 10 more buildings suspected of being affected. Additionally, they will collect dust samples from approximately 10 buildings in the area that are not suspected of being affected. She described how the sampling locations will be documented. ORD will conduct a preliminary chemical analysis as soon as is possible.

Panel Discussion

McVay Hughes asked who owns the Deutsche Bank building today. Evangelista stated that LMDC took ownership last week.

Stellman asked what the Deutsche Bank data show. Evangelista relayed that the data indicated that the building was too contaminated to clean.

Gilman asked for clarification on the electronic format of the data. Evangelista clarified that the data are contained within 330,000 files in Adobe Acrobat pdf format. Prezant asked if Evangelista has enough funding to complete an analysis of these data, and Evangelista indicated they are using the funding they currently have.

McVay Hughes asked if a short summary report of the data is available. Evangelista indicated that there may be a summary report contained within the 330,000 files; however, he wanted to be sure that they had an independent summary of the data only and not an interpretation of the data.

An unnamed community member asked when the demolition will begin. Evangelista noted that it is scheduled for November 1, 2004; however, he could not confirm that was a solid timeframe. Siegel de Hernandez asked what role EPA will play in the deconstruction process. Evangelista indicated that EPA has brought all of the interested private and regulatory parties together to facilitate communication of the responsible

parties, including the Department of Labor and the New York Department of Environmental Protection. EPA Region 2 will continue to oversee these communications and ensure that the correct procedures are taken, but will not necessarily be the "lead" agency.

An unnamed community member commented that LMDC indicated they have already received building department approval. Evangelista responded that they have not yet received approval. Another community member asked who is in charge if there is an accident during demolition. Evangelista said that question will have to be answered before demolition activities can occur.

McVay Hughes asked how the sampling will be performed, and whether heating, ventilation, and air conditioning (HVAC) samples will be collected. Adams responded that they will collect as much dust as is possible from wherever it is available, including HVAC ducts. McVay Hughes also asked where the ten buildings are located. Adams indicated that they hoped to get community input on where they should sample.

6. OVERVIEW PRESENTATION ON SAMPLING AND ANALYSES PROPOSAL AND DISCUSSION

Matt Lorber, EPA National Center for Environmental Assessment

Matt Lorber provided an overview of changes to the sampling proposal that were discussed at the last Technical Panel meeting. These changes were incorporated into the Sampling and Analysis Plan, which was posted to the internet on September 2, 2004. Mr. Lorber reviewed the objectives of the plan and described the general approach for sampling. He noted that the main question at the last meeting referred to the statistical design for selecting sampling locations. Formerly, the plan included a grid and node point design that expanded in concentric circles from Ground Zero. In response to comments, that design is replaced with a spatially balanced probability survey design, described in the paper "Spatially Balanced Sampling of Natural Resources" (*Journal of the American Statistical Association* [2004] 99[465]: 262-278.)

Mr. Lorber presented the main points of this type of statistical sampling. This method is not random since true random sampling could produce clusters. Instead, the spatially balanced method incorporates concentric circles, building type, HVAC, and Environmental Photographic Interpretation Center (EPIC) contamination as possible stratification layers. Mr. Lorber provided an example of implementing this method. He stated that EPA will first need a list of buildings that are available for sampling, since EPA does not have the authority to mandate access to buildings.

Mr. Lorber reiterated that the community has stated they do not want air sampling in their residences. Therefore, the residences would only be sampled using wipe and microvac samples, and the sampling plan will be modified to reflect this. He presented the proposed benchmarks for sampling COPCs and settled dust, and made a correction on the slides that the benchmark units are in terms of cm^2 versus m^2. He noted that lead was proposed as a sample analyte at the residents' request. Mr. Lorber reviewed the data

analysis methods and noted the data will be presented and categorized according to selected stratifications, such as cleaning history, HVAC, and location.

Mr. Lorber concluded his presentation and requested any questions or comments.

Panel Discussion

Lippman reiterated that the community does not want to participate in air testing. He also noted that the contaminants list still needs a lot of work. He commented that the asbestos benchmark was based on Libby, and the Libby samples had a different kind of structure and may not be valid to this program. He also stated that he sees no point in sampling for the list of contaminants if the results are meant to relate to health risks, except for PAHs.

Prezant reiterated that the sampling plan should discuss what will define the need for a clean up. If that threshold is set at background levels, then the plan needs to define what the background levels are for each COPC. Also, Prezant agreed with the inclusion of both small and large fibers in the sampling plan.

7. HUMAN HEALTH EFFECTS PANEL #1

The first afternoon session included presentations from three speakers:

- Dr. Robin Herbert presented "WTC Worker and Volunteer Medical Screening Program."

- Dr. David Prezant presented "Airway and Lung Disease among FDNY Firefighters."

- Dr. Kelly Henning presented "Overview of WTC Health Registry."

7.1 WTC Worker and Volunteer Medical Screening Program

Dr. Robin Herbert, Mt. Sinai School of Medicine

Dr. Herbert presented a portion of the results of a study conducted at Mt. Sinai to track and measure human health effects of 9/11 on the workers at the recovery site and other downtown workers. Dr. Herbert presented the results for 1,138 responders seen in the early phase of screening. These results have been published in the Morbidity and Mortality Weekly Report (MMWR) and are available at EPA's WTC website.

Dr. Herbert reviewed the demographics of these responders and the exposure-based eligibility criteria. She presented the incidence, historical prevalence, and persistence of symptoms and compared these study results to the National Health and Nutrition Examination Survey (NHANES) results, which indicated higher rates of normality than the Mt. Sinai results.

Dr. Herbert reviewed the main conclusions of the study, including the breakout of occupations, hours exposed, and which symptoms showed marked persistence. The

predominant health effects from exposure while working at the WTC site included upper and lower respiratory complications with notable persistence for some symptoms. Additionally, there is a notable mental health component related to the amount of time spent at the site.

Dr. Herbert closed her remarks by commenting that 40 percent of these responders had no health insurance, and commented that the panel should think about ongoing public health needs.

Panel Discussion

Markowitz asked if there is an estimate of the number of people that worked at Ground Zero for whom there are either WTC or firefighter health registry data. Herbert indicated they have not been able to cross-reference these data to make an estimate.

7.2 Airway and Lung Disease Among FDNY Firefighters
Dr. David Prezant, Albert Einstein Division of Pulmonary and Critical Care Medicine and FDNY

This presentation was moved to the end of the Human Health Effects Panel #2 presentations due to lack of time in the Human Health Effects Panel #1 session.

Dr. Prezant's research includes data from nearly 14,000 FDNY firefighters, EMS healthcare workers, and officers that worked at the WTC site. He presented data collected on these rescue workers, including the use of personal protective equipment, time spent on site, and the timeframe they spent at the site. A medical monitoring program was established to capture the effects of 9/11 on this group of workers.

For this medical monitoring program, the firefighters were interviewed and samples were collected. In a study of 39 firefighters there was evidence of that particle compatible with WTC dust were respired causing persistent pulmonary particle deposition and inflammation. Further, particle size analysis on expectorated sputum samples indicated that large particles made their way to lower airways

Dr. Prezant presented the results of extensive biomonitoring (done in collaboration with the CDC) on 400 firefighters during October 2001. His results indicated some elevation of hydrocarbons, antimony, dioxin, PCB congeners, and dioxin congeners; however, none of these compounds were clinically elevated. They also measured urinary 1-hydroxypyrene, urinary antimony, and serum hexachlorodibenzo-p-dioxin (HCDD) and found slight increases over control samples, but no significant clinical elevations.

Dr. Prezant presented the results of 11,000 medical examinations performed between October 2001 and March 2002. Analysis of heavy metals indicated that 7 of 10,000 workers had elevated serum lead, urine mercury, or urine beryllium and 1 of 10,000 had elevated serum lead and mercury.

Respiratory symptoms of WTC workers were consistent with the Mt. Sinai study. There was a significant decrease in lung capacity for the 11,000 worker cohort, with a mean lung capacity (FVC) and forced expiratory volume at 1-second (FEV1) of 96% before the event to a mean of 83 percent in the year after 9/11.

Dr. Prezant also presented results of a methacholine challenge test conducted for a subset of the 11,000 workers stratified to exposure and independent of symptoms. 25% of the workers were initially hyper-reactive following 9/11 and 50 to 70 percent of those participants were persistently hyper-reactive after 9/11.

Dr. Prezant noted a few rare and important findings with the firefighters. There were 3 firefighters with new onset pulmonary fibrosis, 18 with sarcoidosis, and 2 with new onset eosinophilic pneumonitis.

In conclusion, Dr. Prezant noted that the predominant symptoms from the 11,000 firefighters involved in the study included cough, sinus congestion, acid reflux, and shortness of breath.

Panel Discussion

Markowitz asked what portion of the elevated lead levels were above 10 ug/dL. Prezant responded that it was a small portion, and he will share that data with the panel.

Lioy commented that the first responders were exposed to gaseous agents that were never measured. However, with lessons learned and unmet health needs, he remains confident in respirator usefulness for an event like this. Prezant agreed, with the caveat that it is not always practical for a firefighter to wear the correct gear.

A community member noted that a policewoman near her office was not wearing her respirator, leaving it off her face. The community member expressed concern that the downtown office workers were not also given respirators to wear. Prezant responded that he believed the rationale was that people working outside near or on the pile on a continuous basis would be more exposed than people working in offices. However, since that time it has been understood there were more complex issues associated with the plume than initially assumed.

7.3 Overview of the WTC Health Registry
Dr. Kelly Henning, NYC Department of Health and Mental Hygiene

Dr. Henning presented an overview of the WTC Health Registry. She reviewed the purpose of a health registry, and noted that a registry is not a study. Dr. Henning presented background on the funding sources for the study, and reviewed the objectives for the registry including the evaluation of short- and long-term health effects.

Dr. Henning reviewed the methods for becoming enrolled in the study, the baseline surveys, the community outreach activities, and the demographics of the registry

participants. She explained various eligibility criteria for the participants, including occupants of damaged and destroyed buildings, residents living south of Chambers Street, school children. Information about the demographics of the enrollees was presented including zip code, age distributions, sex, and ethnicity, and noted the representative diversity of the registrants. She additionally noted that there is a need to obtain more information on resident children.

Dr. Henning reviewed some of the limitations and concerns of the registry. Many people have moved out of the area and would require extensive outreach to enroll in the registry. Additionally, some groups are underrepresented in the registry, such as children and certain resident groups. There was some delay in the registry start-up due to funding limitations. Given these limitations, however, she noted that the WTC registry has more registrants than any other U.S. health registry.

Panel Discussion

McVay Hughes questioned the notion that the registry is not a study. Given that one purpose is to evaluate health impacts, she asked what the timeframe for this evaluation is. Henning indicated that they are in the process of analyzing these data. McVay Hughes noted that registrants today will have trouble remembering specific events from three years ago for the survey. She also asked how much money EPA has funded the registry for. Gilman answered that $1.5 million has been allotted for the Health Registry.

Markowitz asked for clarification that there was some overlap between the firefighters in the WTC Health Registry and the FDNY program. Henning confirmed this.

Markowitz inquired about the objectives for the registry. Henning indicated that the data could be analyzed by zip code to quantify the self-selection bias. Prezant noted that the large numbers of registry participants might enable future researchers to find additional information down the road. Markowitz questioned the representativeness of the registry participants to the general population. Henning indicated that one could make comparisons to other studies. Prezant agreed, however, and noted that if any correlations between the studies were to occur, participant permission would have to be obtained.

Prezant commented that the WTC Health Registry should take measures to assure the community and labor groups that they will be invited to participate in the establishment of future WTC Health Registry studies.

Gilman noted suggestions from some members of the audience to shut down the registry. He asked Prezant if the registry is beyond repair. Prezant responded that overall the registry questions represent good science and consistency with the Mt. Sinai and the firefighters' registries. There are notable faults, however, such as the length of the questions, but these issues are not worthy of disbanding the WTC registry as long as there are good follow-up studies designed with the community and labor groups' input. He further commented that since the WTC Health Registry has 50,000 registrants, the

decision to end the program should be left to those participants who have enrolled, since they were promised follow-up.

Lioy and Prezant both commented that if the registry program was ended, the scientists would lose that information that could be used to establish early warning for illnesses and tracking the people and trends associated with this type of disaster. Markowitz suggested that the WTC Health Registry establish a peer review group to set out the expectations from the community and compare them to other large registry studies. Henning agreed, and indicated that they are seeking that kind of input.

A community member, Lisa Baum (a representative of many first responder workers), expressed concern about some of the statements that were made in the presentation. She noted concern from the labor community that there are such a low number of participants, and questioned the statistical accuracy given the low numbers of respondents. Additionally, she expressed concern that labor was not asked to participate while the registry was formulated. When labor made recommendations, they were not accepted. Additionally, she noted confidentiality concerns associated with sharing data between studies.

Henning recognized her concerns, and agreed that for certain stratifications, there were low numbers of residents responding. Additionally, there are low numbers of firefighters. She verified that no correlations have been conducted between people in different studies. Doing these correlations would require informed consent in the future. They are hoping to compare total prevalence of symptoms rather than comparing individual people. Henning reiterated that they would like to have more involvement from the labor groups, and hopes to move forward with them.

Rodenbeck noted concerns about the statistical power of the WTC Health Registry. Henning noted there have not been problems with statistical power at this point.

An unnamed community member commented that community members did not register for the WTC Health Registry because the protocol indicated that there are no long-term effects. Another paper by Lioy indicates that there is lack of knowledge about long-term effects. Henning began to comment that the initial language for the registry was drafted in the days immediately following 9/11. New information was obtained in the interim between when that language was drafted and when funding was in place, and there are some inconsistencies in the language that stem from the state of knowledge during those times. The community member noted that there appears to be a bias in that language. Henning responded that she did not think that staff working on the WTC Health Registry are biased against finding health effects related to 9/11. The community member objected and noted that the language reveals a difference between the people who wanted something done and the policy makers. She compared this situation to the disparity between the assurance of no contamination that she received from people working in her building and the test results that indicated contamination. Leighton responded that she knows the WTC Health Registry staff and knows that they are committed to the goals of registry. The community member objected.

Another community member noted that 21,000 school children of vastly different ages have been affected by 9/11. Parents made efforts to be included in the WTC Health Registry and were specifically excluded.

8. HUMAN HEALTH EFFECTS PANEL #2

The second afternoon session included presentations from three speakers:

- Dr. Frederica Perera presented "WTC Dust Effects on Human Development."
- Dr. Joan Reibman presented "Respiratory Effects in Residents Near Ground Zero."
- Dr. Howard Kipen presented "Physical Exposure vs. Mental Stress."

8.1 WTC Dust Effects on Human Development

Dr. Frederica Perera, Columbia University Mailman School of Public Health

Dr. Perera presented research on the effects of prenatal exposure to 9/11. The study researched birth outcomes for women who were pregnant on 9/11. First, Dr. Perera reviewed the parameters of the study, including the study area and the pregnancy week for the women included in the study. All of the women were from the greater NYC metropolitan area and had enrolled in the study before delivery. The women were questioned before delivery, after delivery, and periodically after birth. The goal of the program was to identify the effects of exposure on pregnancies of non-smoking women. Birth outcomes were obtained from medical records.

Dr. Perera showed a map of residents and workplaces of women in the study. Most of the women were within a 2-mile radius of the WTC, which was the area of highest exposure and includes Brooklyn and New Jersey.

The study found two significant results:

1) Term infants born to women living within a 2-mile radius weighed significantly less (3 ounces) than women outside of the 2-mile radius; and
2) Women in their first trimester during 9/11 had children born 3.6 days earlier than normal.

Dr. Perera hoped to follow these children over time to monitor health, growth, and development, and noted that, while the effects are statistically significant, they are modest at this time. The future implications of these effects are unknown, however.

Panel Discussion

Gilman asked Perera if the participants inside and outside of the 2-mile radius had similar socioeconomic characteristics. Perera acknowledged there are differences and the study had to control for these factors, meaning that they had to statistically account for the difference in socioeconomic factors between women.

Perera also noted that the birth weight finding was only seen with women who lived near the WTC and not with those who only worked there. The shorter gestation effect was common to both residents and workers, implying this was related to the acute exposure rather than the long-term exposure since many workers did not return after 9/11.

Markowitz asked how the study was funded. Perera acknowledged that there was little funding at this time, but they are searching for new mechanisms for support so that they can continue to follow the cohort.

McVay Hughes asked if any of the measured biomarkers are COPCs. Perera noted that they tracked PCBs, metals, PBDEs, and PAHs in maternal blood.

8.2 Respiratory Effects in Residents Near Ground Zero

Dr. Joan Reibman, NYU School of Medicine

Dr. Reibman described the NYU School of Medicine study of WTC symptoms from residents near Ground Zero. The study was developed to assess the incidence of new onset and persistent respiratory health effects in residents after 9/11.

The study began 8 months after 9/11 and was developed with input from community groups. The study was developed and publicized with community boards, groups, and organizations. They mailed and hand-delivered information to residents, and had field workers in the buildings to solicit participants. Dr. Reibman described the study groups, noting that they attempted to find residents of buildings right near Ground Zero, and they used uptown Manhattan as the control area. Ultimately they achieved a 22.3 percent response rate in the control area and a 23 percent response rate in the affected area, with over 3,000 individual responses.

Dr. Reibman presented a table of new onset respiratory symptoms among the control group and the exposed group. Fifty-six percent of the exposed population and 20 percent of the control group had new onset symptoms after 9/11. Twenty-six percent of the exposed population had persistent symptoms.

Panel Discussion

Markowitz asked if there were symptom differences between the different neighborhoods. Reibman was not sure. McVay Hughes asked what follow up studies Reibman would suggest. Reibman suggested follow-up studies to see how long people remained affected.

Newman asked the panel to summarize the unmet health needs based on these presentations. McVay Hughes noted that Reibman's study is one of two studies on adult exposures to WTC contamination. Prezant noted another study, regarding Medicaid utilization, is currently undergoing peer review. He will forward the citation to Gilman.

8.3 Physical Exposure vs. Mental Stress

Dr. Howard Kipen, University of Medicine and Dentistry of New Jersey

Dr. Howard Kipen presented an ongoing study looking at modeled plume exposure patterns for the first 2 weeks following 9/11 and its relationship to mental health. A study by Galea et al. in 2002 indicated that post-traumatic stress disorder (PTSD) and depression were higher below Canal Street than below 110th Street. This rate dropped from 7.5 percent to 0.6 percent in the 6 months following 9/11.

Dr. Kipen sought to determine if quantitative exposure estimates of dust would improve the prediction of PTSD and depression. Further, he sought to determine the prevalence of new onset asthma.

Dr. Kipen reviewed the methodological approach to his research. He noted that his data were sanitized to protect the confidentiality of the participants; therefore, while he has information on geographic location and exposure data, individuals were not identified. Dr. Kipen developed arbitrary exposure values that vary geographically according to known variations in the plume path following 9/11. Since it rained in New York 1 week following 9/11, the cumulative exposure pattern is based on 1 week's exposure.

Dr. Kipen presented the calculated cumulative exposure to dust particulate in terms of arbitrary exposure units. There is an order of magnitude difference in arbitrary exposure units from the zone immediately surrounding the WTC site and a zone immediately adjacent to it.

Dr. Kipen reviewed his next steps for this research, which include finishing the preliminary analysis and multivariate modeling.

Panel Discussion

McVay Hughes noted that the phone survey supporting this research was conducted 1 month and 6 months after 9/11, when many people had not yet returned to Manhattan. Therefore, it could be assumed that large quantities of residents are missing from the study design. Kipen agreed this is the case. Prezant further noted that even at the 1 month point, there was a very high incidence of PTSD, even though it was an underestimate. He said that the report indicates these incidence rates are underestimates.

9. PUBLIC COMMENTS

Two public comment sessions were held during the meeting: from 11:15 a.m. to 11:50 a.m. (scheduled from 11:10 a.m. to 12:00 p.m.) and from 4:36 p.m. to 5:00 p.m. (scheduled from 4:00 p.m. to 5:00 p.m.). The following members of the public made comments to the panel:

Jo Pollett

Jenna Orkin
Yvonne Brooks
Robert Gulack
Kimberly Flynn
Stanley Michaels
Alex Sanchez and Manuel Chico
Marjorie Clarke
Joan Greenbaum
Pamela Vossenas
Barbara Caparole

Comments received in writing are provided in Attachment B to this report.